MITSUBISHI ELECTRIC

LCD Projector

WL2650U

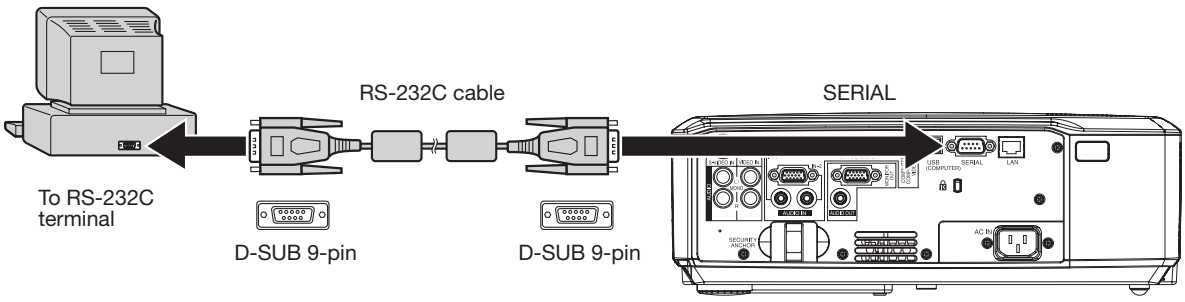
Controlling the projector using a personal computer

This projector can be controlled by connecting a personal computer with RS-232C terminal.

PC-controllable functions:

- Turning the power ON or OFF
- Changing input signals
- Inputting commands by pressing the buttons on the control panel and remote control
- Menu setting

Connection



Important:

- Make sure that your computer and projector are turned off before connection.
- Boot up the computer first, and then plug the power cord of the projector.
  (If you do not follow this instruction, the Com port may not function.)
- Adapters may be necessary depending on the PC connected to this projector. Contact your dealer for details.

1) Interface

PROTOCOL	RS-232C
BAUD RATE	9600 [bps]
DATA LENGTH	8 [bits]
PARITY BIT	NONE
STOP BIT	1 [bit]
FLOW CONTROL	NONE

This projector uses RXD, TXD and GND lines for RS-232C control.
For RS-232C cable, the reverse type cable should be used.

2) Control command diagram

The command consists of the address code, function code, data code, and end code. The length of the command varies among the functions.

	Address code	Function code	Data code	End code
HEX	30h 30h	Function	Data	0Dh
ASCII	'0' '0'	Function	Data	↵

[Address code] 30h 30h (In ASCII code, '0' '0') fixed.
[Function code] A code of each fixed control move.
[Data code] A code of each fixed control data (number) and not always indicated.
[End code] 0Dh (In ASCII code, '↵') fixed.

3) Control sequence

(1) Send the command from the personal computer to the projector.
(2) The projector will send a return command after it receives an end code. If the command is not received correctly, the projector will not send the return command.
(3) The personal computer checks the command and confirms if the sent command has been executed or not.
(4) This projector sends various codes other than the return code. When having a control sequence by RS-232C, reject other codes from the personal computer.

- During signal switching, the command may not take effect even when the projector sends the return command. After signal switching completes, wait for the mode indication to disappear before sending the next command.
- When sending commands successively, wait to receive the return command of the current command before sending a next command.
- Keep intervals of at least 400 ms between receipt of a return command and sending of a next command.
- Any commands will not be executed for 10 seconds after the power is turned on.

[Example] When turning the power ON. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 21 0D '0' '0' '!' '↵'		Command for POWER ON
	30 30 21 0D '0' '0' '!' '↵'	Command receipt confirmation (Command echo back)

4) Operation commands (Not executable in stand-by mode. When the commands for input select are sent while the splash screen is being displayed, the splash screen is only canceled.)

The operation commands are used for the basic operation setting of this projector. They may not be executed while the signals are changed. The operation commands have no data codes.

Operation	ASCII	HEX	Note
POWER ON	!	21h	This command is invalid for 1 minute after the power is turned off.
POWER OFF	"	22h	This command is invalid for 1 minute after the power is turned on.
INPUT COMPUTER 1	_r1	5Fh 72h 31h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT COMPUTER 2	_r2	5Fh 72h 32h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT DVI	_d1	5Fh 64h 31h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT VIDEO	_v1	5Fh 76h 31h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT S-VIDEO	_v2	5Fh 76h 32h	This command will not be executed in Stand-by mode or when the MUTE is executed.

[Example] When setting the input signal to COMPUTER 1. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 5F 72 31 0D '0' '0' '_' 'r' '1' '↵'		Command for setting the input signal to COMPUTER 1
	30 30 5F 72 31 0D '0' '0' '_' 'r' '1' '↵'	Command receipt confirmation (Command echo back)

5) Volume commands (Not executable in stand-by mode. Possible only to read during muting.)

The volume commands are used for the volume setting of this projector with the value.

ITEM	ASCII	HEX	VALUE
VOLUME	VL	56h 4Ch	00–32

How to set the value

Use the ASCII or HEX code as shown below to set the value.

ASCII	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'
HEX	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h

[Example] When setting the volume to 15. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 56 4C 31 35 0D '0' '0' 'V' 'L' '1' '5' '↵'		Command for setting the volume
	30 30 56 4C 31 35 0D '0' '0' 'V' 'L' '1' '5' '↵'	Command receipt confirmation (Command echo back)

6) Keystone commands (Not executable in stand-by mode. Possible only to read during muting.)

The keystone commands are used for the keystone setting of this projector with the value. The value will vary depending on the installation conditions, etc.)

ITEM	ASCII	HEX	VALUE
KEYSTONE (vertical)	KS	4Bh 53h	±35
KEYSTONE (horizontal)	KSH	4Bh 53h 48h	±25

How to set the value

Use the ASCII or HEX code as shown below to set the value.

ASCII	'+'	'-'	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'
HEX	2Bh	2Dh	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h

7) Mute commands (Not executable in stand-by mode.)

The mute commands are used for the mute setting of this projector with the 0 (30h) and 1 (31h).

ITEM	ASCII	HEX	VALUE
MUTE	MUTE	4Dh 55h 54h 45h	0 (OFF), 1 (ON)

8) Remote commands (Not executable in stand-by mode. When the remote commands are sent while the splash screen is being displayed, the splash screen is only canceled.)

Some remote control operations can be achieved by the remote command codes. The remote commands have no data codes.

Button's name on remote	ASCII	HEX
+ VOLUME	r06	72h 30h 36h
- VOLUME	r07	72h 30h 37h
KEYSTONE	r43	72h 34h 33h
EXPAND	r02	72h 30h 32h
PinP	r04	72h 30h 34h
MUTE	ra6	72h 61h 36h
▲	r53	72h 35h 33h
▼	r2b	72h 32h 62h
◀	r4f	72h 34h 66h
▶	r59	72h 35h 39h
MENU	r54	72h 35h 34h
ENTER	r10	72h 31h 30h
AUTO POSITION	r09	72h 30h 39h
STILL	ra4	72h 61h 34h
ASPECT	re2	72h 65h 32h
WALL SCREEN	rd7	72h 64h 37h
CE	re7	72h 65h 37h

[Example] When displaying the MENU selection bar. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 72 35 34 0D '0' '0' 'r' '5' '4' '↵'		Command operating the same as the MENU button
	30 30 72 35 34 0D '0' '0' 'r' '5' '4' '↵'	Command receipt confirmation (Command echo back)

9) Password lock commands

The password lock commands control the password lock. The password lock enabling or disabling command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 added to the end of the data code. When the password lock is enabled or disabled successfully, the projector sends a return command comprising the data code, password, and "1" at the end. When enabling or disabling the password lock fails, it sends a return command with "0" at the end. There is no reconfirmation of the password. The password input command is for enabling projection of image when password lock has been set to DISPLAY INPUT. The password input command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 at the end.

ITEM	ASCII	HEX	VALUE
Password lock enabling/ disabling	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (UNLOCK), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS), 3**** (SPLASH ID SCREEN)
Password input	PASS	50h 41h 53h 53h	****

**** is a 4 to 8-digit password comprised of any figures 1 to 4.

[Example] When enabling the password lock of DISPLAY INPUT (in the case that the password is 123412):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 50 53 4C 4F 43 4B 31 31 32 33 34 31 32 0D '0' '0' 'P' 'S' 'L' 'O' 'C' 'K' '1' '1' '2' '3' '4' '1' '2' '↵'		Command for enabling the password lock of DISPLAY INPUT
	30 30 50 53 4C 4F 43 4B 31 31 32 33 34 31 32 31 0D '0' '0' 'P' 'S' 'L' 'O' 'C' 'K' '1' '1' '2' '3' '4' '1' '2' '1' '↵'	Response informing that the projector succeeded in enabling the password lock of DISPLAY INPUT

10) Reading command diagram

The projectors operating status, such as POWER-ON/OFF and the currently selected input terminal, etc. can be monitored.

	ASCII		HEX	
	Function	Data (Receive)	Function	Data (Receive)
POWER ON	vP	1	76h 50h	31h
POWER OFF	vP	0	76h 50h	30h
INPUT COMPUTER 1	vI	r1	76h 49h	72h 31h
INPUT COMPUTER 2	vI	r2	76h 49h	72h 32h
INPUT DVI	vI	d1	76h 49h	64h 31h
INPUT VIDEO	vI	v1	76h 49h	76h 31h
INPUT S-VIDEO	vI	v2	76h 49h	76h 32h
POWER ON/OFF INPOSSIBLE	vPK	0	76h 50h 4Bh	30h
POWER ON/OFF POSSIBLE	vPK	1	76h 50h 4Bh	31h
NO SIGNAL SUPPLIED	vSM	0	76h 53h 4Dh	30h
SIGNAL SUPPLIED	vSM	1	76h 53h 4Dh	31h

Use the following commands to obtain the values of the items in the INFORMATION menu.

ITEM	ASCII	HEX	VALUE
LAMP TIME (LOW)	vLE	76h 4Ch 45h	hhhhmm
RESOLUTION	vRESO	76h 52h 45h 53h 4Fh	HHHHxVVVV
VERTICAL FREQUENCY	vVFREQ	76h 56h 46h 52h 45h 51h	***.**
HORIZONTAL FREQUENCY	vHFREQ	76h 48h 46h 52h 45h 51h	***.**
SYNC. TYPE	vSYNCT	76h 53h 59h 4Eh 43h 54h	0 (NO SIGNAL), 3 (3wire), 4 (4wire), 5 (5wire), 6 (SCART)

"hhhh" and "mm" represent hours and minutes respectively.
"HHHH" and "VVVV" represent the horizontal and vertical resolutions respectively.

The PC sends the command without attaching the data code to it. On the other hand, the projector attaches to the received command its current operating status as the data code and send it back to the PC.

[Example] When checking the currently selected input terminal (when the INPUT VIDEO is being selected):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 76 49 0D '0' '0' 'v' 'I' '↵'		Command for checking the input terminal
	30 30 76 49 76 31 0D '0' '0' 'v' 'I' 'v' '1' '↵'	Check result (VIDEO)

11) Menu setting commands (Not executable in stand-by mode except for some commands. Possible only to read during muting.)

The menu setting commands are used for the menu setting of this projector. If the personal computer sends the command without attaching the data code, the projector attaches to the received command its current setting value as the data code and send it back to the PC.

ITEM	ASCII	HEX	VALUE
COLOR ENHANCER	CE	43h 45h	0 (AUTO), 1 (PRESENTATION), 2 (STANDARD), 3 (THEATER), 4 (sRGB), 5 (USER)
COLOR ENHANCER-USER-GAMMA MODE	CEU1GS	43h 45h 55h 31h 47h 53h	0 (DYNAMIC), 1 (NATURAL), 2 (DETAIL)
COLOR ENHANCER-USER-RGB-COLOR	CEU1C	43h 45h 55h 31h 43h	±10
COLOR ENHANCER-USER-RGB-TINT	CEU1T	43h 45h 55h 31h 54h	±10
CONTRAST	PP	50h 50h	±30
BRIGHTNESS	QQ	51h 51h	±30
COLOR TEMP.	A	41h	1 (STANDARD), 2 (HIGH), 3 (LOW), 4 (USER)
COLOR TEMP.-USER (CONTRAST)	P	50h	±30 ±30 ±30 (R, G, B)
COLOR TEMP.-USER (BRIGHTNESS)	Q	51h	±30 ±30 ±30 (R, G, B)
COLOR	T	54h	±10
TINT	S	53h	±10
SHARPNESS	R	52h	±5
NOISE REDUCTION	NR	4Eh 52h	0 (OFF), 1 (ON)
CTI	CTI	43h 54h 49h	0 (OFF), 1 (ON)
INPUT LEVEL	IPL	49h 50h 4Ch	±5
WALL SCREEN	WS	57h 53h	0 (OFF), 1 (BEIGE), 2 (LIGHT BLUE), 3 (LIGHT GREEN), 4 (PINK), 5 (BLACK BOARD)
WALL SCREEN (BEIGE)	WSY	57h 53h 59h	1–5
WALL SCREEN (LIGHT BLUE)	WSB	57h 53h 42h	1–5
WALL SCREEN (LIGHT GREEN)	WSG	57h 53h 47h	1–5
WALL SCREEN (PINK)	WSP	57h 53h 50h	1–5
LAMP MODE	LM	4Ch 4Dh	0 (STANDARD), 1 (LOW)
AUTO POWER ON	APON	41h 50h 4Fh 4Eh	0 (OFF), 1 (ON)
AUTO POWER OFF	APOF	41h 50h 4Fh 46h	00 (OFF), 05, 10, 15, 30, 60
SPLASH SCREEN	SS	53h 53h	0 (OFF), 1 (ON)
BACK COLOR	BB	42h 42h	0 (BLACK), 1 (BLUE), 2 (IMAGE)
MUTE MODE	MM	4Dh 4Dh	0 (BLACK), 1 (IMAGE)
IMAGE REVERSE	IR	49h 52h	0 (OFF), 1 (MIRROR), 2 (INVERT), 3 (MIRROR INVERT)
ASPECT	SC	53h 43h	0 (AUTO), 1 (16:9), 2 (REAL), 3 (FULL)
ASPECT (Position of 16:9 image)	SCP	53h 43h 50h	0 (CENTER), 1 (UPPER), 2 (LOWER)
PASSWORD FUNCTION	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (UNLOCK), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS), 3**** (SPLASH ID SCREEN) **** is a 4 to 8-digit password comprised of any figures 1 to 4.
MENU POSITION	MP	4Dh 50h	0 (Upper left), 1 (Lower right)
CINEMA MODE	CINE	43h 49h 4Eh 45h	0 (OFF), 1 (AUTO)
VIDEO SIGNAL (VIDEO only)	VS	56h 53h	0 (AUTO), 1 (NTSC), 2 (PAL), 3 (SECAM), 4 (4.43NTSC), 5 (PAL-M), 6 (PAL-N), 7 (PAL-60)
SET UP	STU	53h 54h 55h	0 (AUTO), 1 (OFF), 2 (3.75%), 3 (7.5%)
SCART INPUT	SRT	53h 52h 54h	0 (OFF), 1 (ON)
LANGUAGE	LG	4Ch 47h	0 (日本語), 1 (English), 2 (Español), 3 (Deutsch), 4 (Français), 5 (Italiano), 6 (中文), 7 (한국어), 8 (РУССКИЙ), 9 (PORTUGUÊS)
RESET ALL	RSTALL	52h 53h 54h 41h 4Ch 4Ch	
MEMORY CALL	MMC	4Dh 4Dh 43h	0 (AUTO), 1 (MEMORY1), 2 (MEMORY2)
HORIZ.POSITION	HP	48h 50h	+ (increment), - (decrement)*1
VERT. POSITION	VP	56h 50h	+ (increment), - (decrement)*1
FINE SYNC.	FN	46h 4Eh	00–31
TRACKING	TRK	54h 52h 4Bh	+ (increment), - (decrement)*1
COMPUTER INPUT	CIN	43h 49h 4Eh	0 (RGB), 1 (YC_BC_R/YP_BP_R), 2 (AUTO)
OVER SCAN	VOS	56h 4Fh 53h	00 (90%) – 10 (100%)

ITEM	ASCII	HEX	VALUE
HOLD	HLD	48h 4Ch 44h	0 (OFF), 1 (ON)
HOLD BEGIN	HLB	48h 4Ch 42h	00–99
HOLD END	HLE	48h 4Ch 45h	00–99
CLAMP POSITION	CLP	43h 4Ch 50h	001–255
CLAMP WIDTH	CLW	43h 4Ch 57h	01–63
VERT. SYNC	VSC	56h 53h 43h	0 (AUTO), 1 (OFF)
LPF	LPF	4Ch 50h 46h	0 (OFF), 1 (ON)
SHUTTER(U)	SHU	53h 48h 55h	00–20
SHUTTER(L)	SHL	53h 48h 4Ch	00–20
SHUTTER(LS)	SHLS	53h 48h 4Ch 53h	00–20
SHUTTER(RS)	SHRS	53h 48h 52h 53h	00–20

*1) Setting range differs depending on the input signals.

- Some commands are not executed depending on the input signal. The operational restrictions same as those on the menu setting are applied. Refer to “Menu operation” in the User Manual for more details.

How to set the value

Use the ASCII or HEX code as shown below to set the value.

ASCII	‘+’	‘-’	‘0’	‘1’	‘2’	‘3’	‘4’	‘5’	‘6’	‘7’	‘8’	‘9’
HEX	2Bh	2Dh	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h

[Example 1] When setting the AUTO POWER ON to ON. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 41 50 4F 4E 31 0D ‘0’ ‘0’ ‘A’ ‘P’ ‘O’ ‘N’ ‘1’ ‘↵’		Command for setting the AUTO POWER ON to ON
	30 30 41 50 4F 4E 31 0D ‘0’ ‘0’ ‘A’ ‘P’ ‘O’ ‘N’ ‘1’ ‘↵’	Command receipt confirmation (Command echo back)

[Example 2] When setting the CONTRAST R of the COLOR TEMP.-USER to +10, the CONTRAST G to 0, and the CONTRAST B to -5. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 50 2B 31 30 2B 30 30 2D 30 35 0D ‘0’ ‘0’ ‘P’ ‘+’ ‘1’ ‘0’ ‘+’ ‘0’ ‘0’ ‘-’ ‘0’ ‘5’ ‘↵’		Command for setting the picture control
	30 30 50 2B 31 30 2B 30 30 2D 30 35 0D ‘0’ ‘0’ ‘P’ ‘+’ ‘1’ ‘0’ ‘+’ ‘0’ ‘0’ ‘-’ ‘0’ ‘5’ ‘↵’	Command receipt confirmation (Command echo back)

[Example 3] When checking the TINT setting (when the TINT is set to +10). (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 53 0D ‘0’ ‘0’ ‘S’ ‘↵’		Command for checking the TINT setting
	30 30 53 2B 31 30 0D ‘0’ ‘0’ ‘S’ ‘+’ ‘1’ ‘0’ ‘↵’	Check result (+10)

[Example 4] When setting the GAMMA MODE of the COLOR ENHANCER-USER to DETAIL. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 43 45 55 31 47 53 32 0D ‘0’ ‘0’ ‘C’ ‘E’ ‘U’ ‘1’ ‘G’ ‘S’ ‘2’ ‘↵’		Command for setting the picture control
	30 30 43 45 55 31 47 53 32 0D ‘0’ ‘0’ ‘C’ ‘E’ ‘U’ ‘1’ ‘G’ ‘S’ ‘2’ ‘↵’	Command receipt confirmation (Command echo back)